

**MRI/NMR-COMPATIBLE, TIDAL VOLUME CONTROL AND
MEASUREMENT SYSTEMS, METHODS, AND DEVICES FOR
RESPIRATORY AND HYPERPOLARIZED GAS DELIVERY**

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Abstract of the Disclosure

Ventilator systems include: (a) a mass flow controller; (b) a gas delivery valve in communication with the mass flow controller and configured to selectively dispense a plurality of different gases to a subject; (c) a first gas source in fluid 10 communication with the gas delivery valve; (d) a second gas source in fluid communication with the gas delivery valve; (e) a first pressure sensor located upstream of the gas delivery valve; (f) a second pressure sensor located downstream 15 of the gas delivery valve; and (g) a controller operatively associated with the first and second pressure sensors and the mass flow controller, the controller comprising computer program code that monitors the pressures measured by the first and second pressure sensors and automatically dynamically adjusts the flow rate of the mass flow controller.